



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076.

Ref. PR No. 1000052153

Rfx. No. 6100002690

Item Description- Metal 3D Printer based on Laser Powder Bed Fusion

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1	Metal 3D Printer based on Laser Powder Bed Fusion	<p>1. <u>Equipment Specification</u></p> <ul style="list-style-type: none">• Technology - Metal additive manufacturing - Selective Laser Melting- Laser powder bed fusion technology.• Build Envelope/ Volume -150mm dia x 180 mm height• Layer Thickness - Min. 20 microns or better• Material Deposition- Recoater blade• Accuracy - Min. $\pm 50 \mu\text{m}$ or better• Build Rate - Min. 10 cc/hr• Gas Requirement - The machine should have the option to operate both Nitrogen and Argon atmosphere. Purity of the gas to be ensured. Give short description.• Editable parameters/variable - Scan speed, laser power, spot size, trace spacing, offset to original contour shall be provided along with the supply.• Certificates - ISO 9001: The bidder or the OEM of the offered products must have ISO 9001 certification <p>2. <u>Laser Specification</u></p> <ul style="list-style-type: none">• Type of Laser - Ytterbium Fiber Laser• Number of Laser source - One or more• Laser Power - 500 W or higher• Laser Scan & Positioning Speed - Exposure: Entire build volume Exposure Speed: up to 8000 mm/s		

		<ul style="list-style-type: none"> • Wavelength - Range of 900 – 1200 nm • Focal Length - Range of 350 – 800 mm • Diameter at focus - Range of 45 - 100 microns • Scanner position repeatability - Min 20µrad or better <p>3. <u>Printing Materials Specification</u></p> <p><u>Material Compatibility</u></p> <ul style="list-style-type: none"> • Machine should have options to print both reactive and non-reactive materials without any changes/upgrades in the hardware • Machine should have the capability to print multiple materials. <p>Third-Party & Tailor- made Material Compatibility</p> <ul style="list-style-type: none"> • The machine should be compatible with third-party Open-Source and tailor-made powder materials. • Factory set parameter values should be freely available for all user material. The machine parameters should be provided in the future in case of the addition of new material is added to the database without any charges • The parameter values supplied should be completely open and editable by the users • Bidder should be flexible to customize powder recoater frame and recoater blade to print 20 µm <p>Shelf Life - The minimum shelf life of the above said materials should be one year or more.</p> <p>4. <u>Software Specification</u> –</p> <p>For seamless integration Build Preparation software, AM Simulation software and AM Parametric Optimization software has to be from the same OEM of the hardware.</p> <p>Control System & Pre Processing Software</p> <p>MS-Windows based Build Preparation software with following capabilities:</p>		
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		<ul style="list-style-type: none"> • Fixing STL Files with automatic mode. • Boolean operations on STL files, union, intersection and difference. • Visualization, measuring and manipulation of STL Files. • Automated part positioning. • Automatic orientation operation. • Scaling and resizing. • Support generation. • Integrated material and build part management • Build time estimation and powder requirement calculation based on volume • Editable and Multiple build strategies • The data preparation software must also have an option for chamfer, fillet, extrude, thicken, split body of the stl file <p>Ability to print low angle support with software (upto 25deg)</p> <p>A video Camera-based or similar monitoring system showing the real-time build operation to the user should be provided.</p> <p>Operating Systems platform for the Software: Windows 10 or higher</p> <p>Build Preparation software license should be Perpetual. In case of up-gradation of the operating system, all the compatible software must be provided without any additional charges</p> <p>01 copies of AM Pre-processing/Build Preparation software. This is for</p> <ol style="list-style-type: none"> i. Part fixing ii. Nesting iii. Optimize orientation based on support volume, recoater interference and thermal gradients. iv Support generation – block, volume, and line support with control parameters. 		
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5. Accessories-

Vacuum Cleaner – ATEX
Certified Separate Immersion proof / wet separator for reactive and non-reactive materials - 1 No. each for reactive and non-reactive materials

Laser Chiller unit suitable for the machine - 1 No.

Integrated glove box for easy removal of powders and set up - 1 No.

Recoating blade - 25 Numbers.

Gas filter - The system should possess dual filtration with (F9, H13 or H14 as per requirement) HEPA filters to enhance high efficiency in filtering. - 10 Nos. or higher

Printing materials to be supplied –

- Ti-6Al 4V - 40 kgs
- SS316L - 40 Kgs
- IN718 - 40 kgs
- Alsi10mg - 20 Kgs
- CocrZr(Med) - 40 Kgs
- Nitinol - 10 Kgs

Build Plate - 2 nos. of each Aluminum, Steel and Titanium should be provided.

Suitable Workstation –

1. Processor: (Intel Core i7) Acceleration i7-12700 (12 Cores/25MB/20T/4.9GHz/65W, support Win 11/Win11 DG/Linux), Energy Star Qualified, Intel Core i7 Processor Label.
2. Memory (RAM) (DDR4 RAM): 128GB RAM Highly recommend memory space for the smooth running of AM Builder.
3. Graphic Card (4GB): AMD Radeon RX 640 4GB FH (DP/MDP/MDP).
4. Hard Drive : M.2 2230 512GB PCe NVMe Class 35 Solid State Drive (EM).
5. Storage Drive : Additional 3.5 inch 2TB 7200rpm Hard Disk Drive.

		<p>6. Operating Systems: Windows 10 Pro (Includes Windows 11 Pro License) English 1 OS-Window Media.</p> <p>7. Monitor: 32" Display</p> <p>Certified Fire Extinguisher – 2 Nos.</p> <p>6. <u>Warranty</u></p> <p>1 Year Warranty for machines, Accessories and software.</p> <p>7. <u>Documentation</u></p> <p>The following documents (Hard copy 2 sets and soft copy in CD/Flash drive/HDD) in English language to be provided:</p> <ul style="list-style-type: none"> a) User manual, operation manual and maintenance manual (For Mechanical, Electrical Electronic hardware circuits) of the entire system and subsystems. b) System Administration and maintenance manual shall cover detailed system configuration and administration with the help of sketches. The safety instructions, maintenance schedule, preventive maintenance schedule with possible errors and trouble-shooting is to be provided. c) Standard operating procedure (SOP), Calibration and Software manual. d) Original software Licenses for all the Software should be included. e) Calibration certificates as per international standard of all the artifacts. Reference standard used for the same shall be provided <p>All the data and results of testing and calibration of the entire system at manufacturer's site as well as at our site shall be properly documented and supplied. Certificate for general compliance</p>		
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		<p>with standard, safety and protection to be provided.</p> <p>8. Utilities/ Infrastructure for Installation</p> <ul style="list-style-type: none"> • Supplier shall indicate all the required utilities / infrastructure such as power, water, gas etc. including power backup requirements. • Supplier shall provide overall dimensions of the Unit along with floor area/height of the site or building, including foundation details if any, for accommodating the system and sub-systems. • The layout, pre-installation requirements and foundation drawing of the offered system should be enclosed with the technical offer. • The operating environment for the system and subsystems including temperature and humidity control, ant vibration etc. should be indicated. <p>9. Terms and Conditions</p> <ul style="list-style-type: none"> • Profile of the Certified Training and service staff in India need to be shared. • OEM should be able to support the machine for next 10 years. • The participating vendor should have a minimum turnover of INR. 7 cr. • The system should have a scope for future upgrades/retrofitting of the Laser Source for a Higher Power Rating. • The machine should satisfy all Laser Safety Standards. • The machine should be able to run unattended for the entire duration of the build without the operator's interference. 		
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		<ul style="list-style-type: none"> • Powder replenishment should be possible without interruption of the build process. • Provision should be given for Upgradation to higher build platform systems through buyback in future. • At least Five machines of Quoted type should be running successfully at any Government Organizations like IIT's, NIT's, Educational institutions, automotive, aerospace and PSU (Public Sector Undertaking) in India. • Vendor quoting should have a proven track record with expertise in Metal Additive Manufacturing for a minimum of 3 years. • Custom-made machines are not acceptable. Machines should be a proven model in the market and that should not be a prototype or developmental system. Product quoted should be from the standard Product range • At least 4 installation and feedback forms for the quoted machine configuration should be provided. • Original catalogue (not any photocopy) of the quoted model duly signed by the authorities of the bidding company must accompany the offer / bid including country of origin • Pre-dispatch inspection of the Machine will be arranged by the company/bidder on the company/bidder cost before dispatch of the Machine. <p>Payment Terms</p> <ul style="list-style-type: none"> • 100% payment shall be made by ICICI Foundation on behalf of IIT Bombay after successful delivery and installation at the specified location. 		
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